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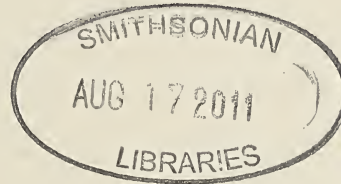
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# The Maryland Naturalist

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## The distribution of *Hoperius planatus* Fall (Coleoptera: Dytiscidae) in Delaware, Maryland, and Virginia

C. L. STAINES

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**Abstract.**—The insect collections at University of Delaware, Smithsonian Institution, and Virginia Museum of Natural History were examined for specimens of *Hoperius planatus* Fall. A total of 105 specimens were found from coastal plain counties in all three states. Adult beetles are active year round when the water is not frozen.

The genus *Hoperius* was erected by Fall (1927) for the new species *H. planatus* from Hope, Arkansas. The species has been reported from South Carolina (Kirk 1969), Georgia (Turnbow & Smith 1983), Maryland and Virginia (Spangler 1973, Michael & Matta 1977), Alabama (Folkerts & Donovan 1974), and Texas (Knight-Jasper & Vogtsberger 1996).

Kirk (1969) noted that *H. planatus* was attracted to light and had been found on the beach. Spangler (1973) described the larva and pupa and noted that the species was found in seasonal woodland pools lacking vegetation but containing decaying leaves. Knight-Jasper & Vogtsberger (1996) collected adults in a swamp with emergent trees but no other emergent vegetation, a firm sandy substrate, decaying leaves, and a depth of less than 20 cm.

The species is uncommon in the mid-Atlantic area appearing to be restricted to the coastal plain. It is a candidate for threatened or endangered species status in Maryland, Arkansas, and Delaware (Anonymous 2003, 2005, 2007).

### METHODS

The insect collections at the University of Delaware (UDCC), Smithsonian Institution (USNM) and the Virginia Museum of Natural History (VMNH) were examined for specimens of *H. planatus*.

### RESULTS

A total of 105 specimens of *H. planatus* were found in the USNM and VMNH collections. No specimens were found in the UDCC collection.

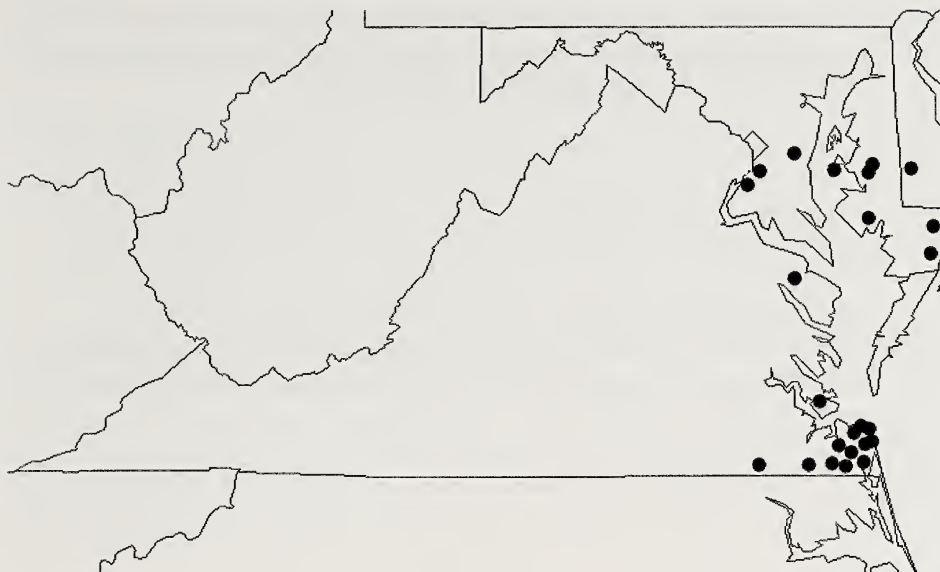
**Delaware:** Sussex County: Blackbird State Forest, 30 June 1997, C. M. Heckscher (1, USNM). **Maryland:** Anne Arundel County: Patuxent Research Refuge, 1 June 2000, C. L. Staines & W. E. Steiner, at blacklight (2, USNM). Dorchester County: Lecompte Wildlife Management Area, 21 May 1997, C. L. & S. L. Staines, sphagnum swamp (15, USNM). Prince George's County: National Colonial Farm, 30 May 2003, J. D. Glaser, at blacklight (1, deposited in National Park Service collection); Oxon Hill, 11 July 1972, G. F. Hevel, at light (1, USNM). Talbot County: Easton, Seth State Forest, 13 June 1967, J. L. Hellman (2, USNM), 19 July 1971, P. Spangler (2, USNM), 6 May

1972, P. & P. Spangler (1, USNM), 8 May 1973, P. & P. Spangler (5, USNM), 19 July 1971, R. D. Gordon (6, USNM), 26 September 1971, J. Utmar (1, USNM), 29 July 1973 Spangler & Cross (8, USNM), 5 May 1997, W. E. Steiner (2, USNM), 8 June 1997, W. E. Steiner (1, USNM), 9 June 1997, W. E. Steiner, at blacklight (4, USNM), 11 June 1997, W. E. Steiner, at blacklight (9, USNM), 21 November 1997, W. E. Steiner (1, USNM); Third Haven Wood TNC Preserve, 11 November 1997, J. M. McCann (1, USNM); Wittman, 26 May 1973, W. E. Steiner (1, USNM), 25 May 1991, W. E. Steiner & J. M. Swearingen (1, USNM), 24 May 1997, W. E. Steiner (4, USNM), 28 June 1997, W. E. Steiner (1, USNM). Worcester County: Pocomoke State Forest, 18 May 1997, W. E. Steiner, at blacklight (3, USNM), 19 May 1997, at blacklight (2, USNM); 8 km WNW Snow Hill, 12 June 1994, W. E. Steiner (1, USNM). **Virginia:** Chesapeake City: 9 March 1971, Anthony (1, USNM), 9 March 1971, Blum (2, USNM), 25 November 1972, Nolan (1, USNM); Stumpy Lake, 18 April 1973, AEM (2, USNM). Greenville Co.: DF site at end of VA 666, 1 mi NE Claresville, 3 June 1993, VNMNH survey (1, VMNH). Isle of Wright Co.: ponds 2 km E. of Windsor, pond 1, 22 May 1993, M. D. Noman (1, VMNH). King & Queen Middlesex Cos.: Dragon Swamp, Big Island, 1.5 mi SE VA Rte. 602, 19 May 2000, Chris Hobson & Anne C. Chazal (2, VMNH). Norfolk City: 1 April 1970, D. Crandall (1, USNM). Southampton Co.: 2.5 mi NE Ivor, Pompei Swamp Reserve, off Rte. 617, 8 Aug 1996, S. M. Robie & R. L. Hoffman (1, VMNH). Suffolk City: Dismal Swamp, 11 June 1970, Matta (1, USNM), 30 June 1970, Matta (2, USNM), 30 September 1972, Sorey (2, USNM), 30 September 1972, Walsh (2, USNM), 30 May 1973, Pair (1, USNM), 2 July 1973, AGM (1, USNM), 11 May 1983, Matta (1, USNM); GDSNWR, West Ditch, 16 May 1998, S. M. Robie (1, VMNH); GDSNWR, West Ditch, 16 May 1998, S. M. Robie & E. L. Quinter, UV (2, VMNH). York Co., Grafton Ponds, Middle Drift Fence, 20 Dec 1990, VDNH survey, K. A. Buhlmann (1, VMNH). Virginia Beach: 7 February 1973, AM (1, USNM), 7 June 1973, AM (2); Oceana Naval Air Station, 3 May 1989, Va. Div. Nat. Hert. Surv. (1, USNM); Dam Neck Naval Base, Lovetts Marsh, 30 Dec 1990, D. A. Young & K. A. Buhlmann (1, VMNH).

#### DISCUSSION

From the data presented, *H. planatus* is widely distributed on the coastal plain of Delaware, Maryland, and Virginia (Map 1). Collecting dates range from 7 February to 30 December indicating, that as with many water beetles, adults are active whenever the water is not frozen. The number of collecting dates by month is as follows: February- 1, March- 2, April- 2, May- 17, June- 12, July- 5, August- 1, September- 3, November- 3, and December- 2. The majority of specimens with collecting information were from black light or UV light. The only other habitat mentioned was a sphagnum swamp in Dorchester County, Maryland.

Most of the specimens are from recent surveys of specific habitats, so it appears that the species is widespread and more common than was originally thought. Additional collecting is likely to reveal additional localities.



#### ACKNOWLEDGMENTS

I thank C. R. Barlett, University of Delaware, W. E. Steiner, Smithsonian Institution, and R. L. Hoffman, Virginia Museum of Natural History, for access to the collections under their care. Susan L. Staines provided field and editorial assistance.

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## **The Dytiscidae, Gyrinidae, Haliplidae, Helophoridae, Hydrochidae, and Hydrophilidae (Insecta: Coleoptera) of Fort Washington and Piscataway National Parks, Maryland**

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**Abstract.**—An inventory of the Dytiscidae, Gyrinidae, Haliplidae, Helophoridae, Hydrochidae, and Hydrophilidae (Insecta: Coleoptera) of Fort Washington and Piscataway National Parks was conducted. A total of 39 species were found; 14 Dytiscidae, 1 Gyrinidae, 1 Haliplidae, 1 Helophoridae, 1 Hydrochidae, and 21 Hydrophilidae. Four species which are under review as Maryland threatened/endangered species were found: *Agabetes acuductus* (Harris), *Hoperius planatus* Fall, *Hydrocolus deflatus* (Fall) (Dytiscidae), and *Helocombus bifidus* (LeConte) (Hydrophilidae).

### INTRODUCTION

The Dytiscidae (predaceous diving beetles) are predators and scavengers as larvae and adults and are found in both lentic and lotic habitats. Many species are good fliers and are able to quickly colonize new bodies of water or disperse if their habitat dries up. Most genera require males and genitalia extraction for species determinations. The North American fauna of 500 species is well studied (Larson et al. 2000); Staines (1986a) reported 84 species from Maryland. According to the Maryland Natural Heritage Program, *Hoperius planatus* Fall and *Laccophilus schwarzi* (Fall) are candidates for endangered or threatened species in the state. Species of concern are *Agabetes acuductus* (Harris) and *Hydroporus deflatus* Fall (Anonymous 2003).

The Gyrinidae (whirligig beetles) are named for the circular patterns in which the adults swim, their swimming is aided by a secreted surfactant. Many species congregate in large numbers on the surface of ponds and streams. However, when disturbed they quickly dive or scatter widely. Other species cling to the roots of undercut stream banks. Adults are scavengers on dead and dying insects floating on the water surface. Larvae are predaceous, feeding on immature stages of aquatic insects. Gyrinids are easy to identify at the generic level, but species determinations require males for genitalic extractions. The 56 species known from North America are fairly well studied (Roughley 2001a). Staines (1986a) reported 20 species in two genera from Maryland.

The Haliplidae (crawling water beetles) is easily distinguished by the enlarged hind coxal plates. Adults are feeble swimmers; they are most often found crawling along submerged vegetation. Haliplids of all stages are found on the edge of small ponds, lakes or quiet streams and often found in mats of filamentous algae, *Chara*, or other similar vegetation. Adults feed on insect eggs, algae, and Hydrozoa polyps; larvae are algophagous. Adults are active all year when weather permits and egg laying takes place from spring to early summer and again in the fall. There are 67 species known from North America and are fairly well studied (Roughley 2001b). Genera are easy to

distinguish but species determinations require males for examination of the genitalia. Staines (1984, 1986a) reported 13 species in two genera from Maryland.

Helophoridae are small beetles whose adults are aquatic but the larvae are found in soil or vegetation, not in the water (Van Tassell 2001). There are 43 species in North America (Smetana 1985). Staines (1986b) reported one genus and three species from Maryland.

The family Hydrochidae consists of small (1.5 to 5.5 mm) species which live in pools and ponds. There are 26 species in North America (Van Tassell 2001). Staines (1986b) reported 13 species from Maryland.

The Hydrophilidae (water scavenger beetles) are mainly aquatic but the subfamily Sphaeridiinae is terrestrial and lives in animal dung, fungi, and decaying plant material. Aquatic species are found in stagnant pools, littoral areas of lakes and ponds, shallow quiet water of streams, and springs. Aquatic species are predaceous as larvae; adults are predaceous on snails or other small invertebrates, omnivorous or phytophagous. According to the Maryland Natural Heritage Program, *Hydrochara occulata* d'Orchymont, *Hydrochus spangleri* Hellman, and *Sperchopsis tessellatus* Ziegler are candidates for endangered or threatened species in the state. *Helocombus bifidus* (LeConte) is a species of concern. The 258 North America species are fairly well known (Van Tassell 2001). Many genera require males and examination of genitalia for species determinations. Staines (1986b) reported 87 species from Maryland. Of these 59 are aquatic and 28 terrestrial.

Fort Washington National Park consists of 341 acres surrounding the historic fort and is located in Fort Washington, Maryland (Prince George's County, 38°7'1185"N 77°03'040"W). Piscataway National Park encompasses 4625 acres stretching for 6 miles along the Potomac River from Piscataway Creek to Marshall Hall and is in Prince George's and Charles Counties (38°69'222"N 77°01'410"W). The parks consist of lowland mixed hardwood-conifer forest predominated by *Liriodendron*, *Quercus*, *Fagus*, and *Pinus* with tracts of agricultural land. The elevation varies from 0 to 55 m. The Fort Washington site is dominated by the coastal fort which was an active military base from 1809 to 1946.

#### METHODS

Aquatic beetles were collected by three methods. A standard aquatic net was used along pool margins as well as in deeper or more interior sections of the pool. The "floatation" method involved stirring and agitating the submerged leaf litter along the pool margin by hand and holding it submerged for about a minute, causing beetles to float to the surface where they were easily visible and could be captured with a fine-mesh net. This is very effective for the smaller species. Finally, black lights were used to capture numerous species. Field work was conducted from 24 April to 25 August 2003. Voucher specimens have been placed in the collection of the National Park Service, National Capital Area.

#### RESULTS

A total of 39 species were found. There were 14 Dytiscidae, 1 Gyrinidae, 1 Halipliidae, 1 Helophoridae, 1 Hydrochidae, and 21 Hydrophilidae (17 aquatic, 4 terrestrial).

*Dytiscidae*

*Agabetes acuductus* (Harris) is a woodland pool specialist (Spangler & Gordon 1973) and is a candidate for threatened or endangered status in Maryland (Anonymous 2003); adults are sometimes taken at lights. One specimen was taken on 31 July 2003 at black light at Mockley Point.

*Agabus gagates* Aubé is most commonly found in woodland pools as well as beaver ponds, flooded pastures, and stream margins; adults are taken at lights (Michael & Matta 1977). Specimens were taken at black light on 30 May 2003 at Colonial Farm.

*Bidessonotus inconspicuus* (LeConte) has been found in ditches, ponds, streams, woodland pools, and at lights (Larson et al. 2000). Specimens were taken at black light on 30 June 2003 at Mockely Point.

*Copelatus glyphicus* (Say) is abundant in temporary pools; adults are commonly taken at lights (Spangler 1962). Specimens were taken in woodland pools on 24 April 2003 at Farmington Landing and at black light at Colonial Farm on 30 May 2003 and Mockely Point on 30 June 2003.

*Coptotomus interrogatus* (Fabricius) has been found in lakes, ditches, and at lights (Ciegler 2003). Specimens were taken at black light on 30 May 2003 at Colonial Farm.

*Heterostenata pulcher* (LeConte) has been found on clay, sand, or gravel along the margins of streams (Ciegler 2003). Specimens were taken on 31 July 2003 at black light at Mockely Point.

*Hoperius planatus* Fall has been found in woodland pools and wooded swamps without emergent vegetation, and at lights (Spangler 1973; Knight-Jasper & Vogtsberger 1996) and is a candidate for threatened or endangered status in Maryland (Anonymous 2003). One specimen was taken at black light on 30 May 2003 at Colonial Farm.

*Hydrocolus deflatus* (Fall) has been found in spring seepages, swamps, and at lights (Ciegler 2003) and is a candidate for threatened or endangered status in Maryland (Anonymous 2003). One specimen was taken in a woodland pool on 2 June 2003 at Fort Washington.

*Hydroporus niger* (Say) has been found among the emergent vegetation of sunny ponds (Ciegler 2003). Specimens were taken in woodland pools on 20 May 2003 at Marshall Hall.

*Ilybius oblitus* Say has been found in lakes, ponds, ditches, and swamps (Ciegler 2003). Specimens were taken at black light on 30 May 2003 at Colonial Farm and on 31 July 2003 at Mockley Point.

*Neoporus clypealis* (Sharp) is a generalist, found in almost any aquatic habitat; adults are attracted to lights (Hilsenhoff 1995). Specimens were taken at black light on 30 May 2003 at Colonial Farm and 30 June 2003 at Mockley Point.

*Neoporus undulatus* (Say) has been found in rivers, lakes, and ponds (Ciegler 2003). Specimens were taken in woodland pools on 20 May 2003 at Marshall Hall.

*Thermonectes basillaris* (Harris) is most commonly found in temporary pools with clear water and no vegetation; it is considered a pioneer species; adults are attracted to lights (Michael & Matta 1977). Specimens were taken at black light on 20 June 2003 at Mockley Point.

*Uvarus granarius* (Aubé) is found on mats of vegetation along shallow bodies of water; they are especially common in woodland pools and bogs (Larson et al. 2000). Specimens were taken in woodland pools on 24 April 2003 at Marshall Hall.

*Gyrinidae*

*Dineutus emarginatus* Say has been found in ponds, lakes, rivers, and at lights (Ciegler 2003). Specimens were taken in woodland ponds on 20 May 2003 at Marshall Hall.

*Halipilidae*

*Peltodytes sexmaculatus* Roberts has been found in lakes, slow streams, ditches, pools, and on mud flats (Ciegler 2003). Specimens were taken in a farm pond on 24 April 2003 at Colonial Farm and in woodland ponds on 20 May 2003 at Marshall Hall.

*Helophoridae*

*Helophorus linearis* LeConte has been found in a variety of aquatic habitats (Smetana 1985). A single specimen was taken in a seep on 2 June 2003 at Fort Washington.

*Hydrochidae*

*Hydrochus excavatum* LeConte is a coastal plain species which is found in a variety of pools, ponds, and streams; adults are attracted to lights (Hellman 1975). Specimens were taken in woodland pools on 12 May 2003 at Marshall Hall.

*Hydrophilidae*

*Berosus exiguus* Say is found in the margins of rainwater pools and other temporary situations but it not commonly collected (Van Tassell 1966). Specimens were taken in woodland pools on 24 April 2003 at Colonial Farm and at black light on 30 June 2003 at Mockley Point.

*Berosus peregrinus* (Herbst) prefers quiet water along streams or ditches but can be occasionally found in temporary pools (Van Tassell 1966). Specimens were taken at black light on 31 July 2003 at Mockely Point.

*Berosus striatus* (Say) has been taken in rivers, lakes, ponds, ditches, and at lights (Van Tassell 1966). Specimens were taken at black light on 30 May 2003 at Marshall Hall, 31 July 2003 at Colonial Farm, and 31 July 2003 at Mockley Point.

*Cercyon haemorrhoidalis* (Fabricius) has been found in dung, carrion, leaf litter, compost piles, and at lights (Smetana 1978). Specimens were taken in cow dung on 12 May 2003 at Mockley Point.

*Cercyon praetextatus* (Say) is found on carrion and dung; adults are attracted to lights (Smetana 1974). Specimens were taken in cow dung on 31 July 2003 at Mockley Point.

*Cercyon pygmaeus* (Illiger) is found in dung, fungi, carrion, and compost piles; adults are attracted to lights (Smetana 1978). Specimens were taken in cow dung on 12 May 2003 at Mockley Point.

*Cercyon roseni* Knisch is associated with *Carex* swamps and wet moss; adults have also been collected in leaf litter and debris; they are attracted to lights (Smetana

1978). Specimens were taken at black light on 31 July 2003 at Mockley Point.

*Cymbiodyta rotunda* (Say) has been found in woodland pools (Ciegler 2003). A single specimen was taken at black light on 30 May 2003 at Colonial Farm.

*Enochrus cinctus* (Say) is commonly collected in very shallow woodland temporary pools with abundant rotting vegetation (Gunderson 1978). Specimens were taken at black light on 30 May 2003 at Colonial Farm and 30 June 2003 at Mockley Point.

*Enochrus consortus* Green is not common but is found in pools with a layer of debris on the bottom (Gunderson 1978). Specimens were taken in woodland pools on 24 April 2003 at Marshall Hall and 29 April 2003 at Farmington Landing.

*Enochrus ochraceus* (Melsheimer) is a widespread and locally abundant species; they are sometimes collected in large numbers in any weedy or debris-clogged shallow water (Gunderson 1978). Specimens were taken at black light on 30 May 2003 at Colonial Farm and 30 June 2003 at Mockley Point.

*Enochrus perplexus* (LeConte) is common in temporary pools of various types; it flies readily when taken from water (Gunderson 1978). Specimens were taken in woodland pools on 24 April 2003 at Marshall Hall and at black light on 31 July 2003 at Mockley Point and 25 August at Colonial Farm.

*Enochrus pygmaeus nebulosus* Say is found in quiet waters with rotting leaves and other plant debris (Gunderson 1978). Specimens were taken in woodland pools on 24 April 2004 at Marshall Hall and at black light on 30 June 2003 at Mockley Point and 30 May 2003 at Colonial Farm.

*Helochaeres maculicollis* Mulsant has been found in thin-bladed, grassy vegetation at the margins of ponds and lakes (Testa & Lago 1994). Specimens were taken on swamp margins on 24 April 2003 at Marshall Hall.

*Helocombus bifidus* (LeConte) is found in streams, ditches, woodland pools, and edges of lakes; adults are attracted to lights (Perkins & Spangler 1981) and is a candidate for threatened or endangered status in Maryland (Anonymous 2003). Specimens were taken at black light on 30 May 2003 at Colonial Farm and on 30 June 2003 at Mockley Point.

*Hydrochara obtusata* (Say) adults commonly come to lights (Smetana 1980). Specimens were taken in woodland pools on 24 April 2003 at Marshall Hall and at black light on 31 July 2003 at Mockley Point.

*Hydrochara soror* Smetana is found on ponds, streams, and ditches; adults commonly come to lights (Smetana 1980). Specimens were taken at black light on 30 May 2003 at Colonial Farm.

*Paracymus subcupreus* (Say) is found in a wide variety of aquatic habitats but prefers shallow, standing water with abundant organic matter (Wooldridge 1966). Specimens were taken at black light on 31 July 2003 at Mockely Point.

*Tropisternus blatchleyi* d'Orchymont seems to prefer shallow pools and ponds but may be found in any quiet water habitat; adults are attracted to lights (Matta 1974). Specimens were taken at black light on 20 May 2003 at Marshall Hall, 30 June 2003 at Mockely Point, and 25 August 2003 at Colonial Farm.

*Tropisternus collaris* (Fabricius) has been found in shallow standing water with other *Tropisternus* species; adults are attracted to lights (Matta 1974). Specimens were taken at black light on 30 June 2003 at Mockley Point and Colonial Farm on 25 August 2003.

*Tropisternus lateralis nimbalis* (Say) is very common and can be found in shallow standing water; it prefers areas with dense rooted vegetation and may occur in running water if the vegetation at the margin is thick enough; adults are attracted to lights (Matta 1974). Specimens were taken at black light on 30 May 2003 at Colonial Farm and on 30 June 2003 at Mockley Point.

#### DISCUSSION

A total of 39 species were found. There were 14 Dytiscidae, 1 Gyrinidae, 1 Haliplidae, 1 Helophoridae, 1 Hydrochidae, and 21 Hydrophilidae. This is 17.7% of the Maryland fauna. The aquatic component is a combination of 31 habitat generalists and four woodland pool specialists. The four terrestrial hydrophilids are habitat generalists.

Four species which are under review for listing as Maryland threatened/endangered species were found: *Agabetes acuductus* (Harris), *Hoperius planatus* Fall, *Hydrocolus deflatus* (Fall) (Dytiscidae), and *Helocombus bifidus* (LeConte) (Hydrophilidae).

#### ACKNOWLEDGMENTS

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## Champion Trees of Maryland, with New Records for Wicomico County

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**Abstract.**— Most people are aware that there is a National Big Tree Registry, celebrating the largest trees of each species in the United States, but fewer are aware that this Registry was started in Maryland, and that Maryland had the first official State Big Tree Registry. Within Maryland some counties have registries and some do not. In this paper we review the current status of the Big Tree registries at the county level. We also present updated records for Wicomico County, including the discovery of four new State Champion trees.

### INTRODUCTION

#### *National Big Tree Registry*

The United States hosts the oldest, largest, and tallest trees on the planet, but it was not until 1940 that we started documenting them. As Charles Darwin noted in his classic text, *The Origin of Species*, there is individual variation within every species (Darwin 1859). As a result of the genetic differences of individuals, as well as differences in environmental factors where individuals are located, there is, somewhere, a size champion for each species on earth – the largest living specimen of that particular species. Humans seem especially interested in finding the largest of each tree species. The National Register of Big Trees is managed by the American Forests organization (formerly known as the American Forestry Association). Because trees continually grow, and eventually die, the list of big trees is always in flux. As a result, boxing terms such as: contender, champion, challenger, and title; are used in describing the status of a tree. The largest of each tree species is considered the national champion. If another tree of the same species ranks within five points it is considered a co-champion (see methods for full description of point system). Information on current champions is published bi-yearly in hard copy and electronically (American Forests 2006).

#### *State Big Tree Registry*

Maryland holds a historic distinction regarding big trees — it was the first state in the nation to have an official state registry. The registry was the idea of Maryland's first State Forester, Fred W. Besley. It was started with a Big Tree Contest in 1924. The contest proved to be so popular that he urged the American Forestry Association to develop a national contest. The American Forestry Association was also inspired by forester Joseph Stearns who wrote, "If anything can be done to locate, save, protect, and publicize our largest remaining tree specimens, in each species, now is the time to act" (1940). As a result, the first National Big Tree Contest was held in 1940, and the second was held in 1955. Maryland had an advantage in the early national contests because records were already being collected for the state registry and the largest trees of each species in the state had already been identified. As a result of this early start

Maryland had more champions in the 1955 contest (45) than any other state (Bronaugh 2004). Eventually the other states established their own lists and Maryland was no longer the record holder, but even so — considering its diminutive size (42<sup>nd</sup> out of 50) — Maryland still makes an impressive showing on the list of national champions. In part this is because Maryland has many diverse habitats in a relatively small area. This diversity is one reason Maryland is sometimes called “America in miniature.” Maryland has species that were pushed southward by glacial events, as well as species that spread northward from refugia after the glaciers retreated (Brown and Brown 1972).

All fifty states now have their own Big Tree Registries. Although individuals may nominate a tree for the National Big Tree Registry, most nominations are made by the Big Tree coordinators in each state. Maryland’s registry is managed by the Department of Natural Resources (DNR) Forest Service and it may be viewed on their website (DNR 2007). As of this writing there are 1,953 trees and shrubs on the registry representing 281 species. A tree can be on the State Big Tree Registry without being a champion. Trees are rated on a point system which is described below. Trees are also eligible to be on the registry if they have at least 300 points or 70% of the points of the current state champion tree of that species. Since the demise of the Wye Oak, the largest tree in Maryland is a silver maple located in Cecil County. Although trees from every county have been nominated for the state registry not every county has a separate registry documenting its champion trees.

#### County Big Tree Registries

In addition to the National Big Tree Registry, and the State Big Tree Registry, should a county bother to keep a County Big Tree Registry? We say yes. By not recording where the biggest trees of each species are located it is possible, and probable, that champions are being cut unknowingly. In many cases the pride of being a champion tree owner has overshadowed the bother and expense of caring for a mature tree and persuaded a property owner to spare the axe. In many instances trees that are the largest in the county turn out also to be the largest in the state — and sometimes even the largest in the nation — so documenting the biggest trees in a county makes the other registries more robust.

Besides bragging rights, what difference does it make if a tree is a county champion? Is there any protection for a national, state, or county champion tree? Regulations vary according to jurisdiction, but in general there is little legal protection for champion trees at any level. Maryland passed a Forest Conservation Act in 1991. Under the regulations resulting from that act developers in all counties except Allegany and Garrett are required to submit a Forest Stand Delineation to their county planning office documenting the extent and condition of existing forest on a site where development is planned. The Forest Stand Delineation must show priority retention areas. Priority retention areas include, among other things, trees “designated as National, State, or local Champion Tree, and trees which have a diameter at 4.5 feet above the ground (DBH) of 30 inches, or 75% of the DBH of the current State Champion of that species” (Howell and Ericson 1997). A county champion, therefore, should be included in a priority retention area as a local champion; but if no county big tree list is kept there is no way to know where the local champions are. Maryland counties that maintain a big tree list are therefore more likely to have priority retention areas on their Forest Stand Delineations.

Before development is allowed a Forest Conservation Plan must be approved which shows the extent of planned forest clearing and retention. Developers are expected to make “every effort” to retain the priority retention areas (M. Honeczy, personal communication 5/30/07), although they may show an unreasonable burden or propose an alternative and still have the plan approved. So the champion trees are legally recognized, but not necessarily protected, under Maryland’s state law. Local governments, however, are able to impose stricter ordinances. For instance, Montgomery County passed a bill in October, 2006, which clarifies and strengthens protection for county champion trees (County Council 2006).

Despite the benefits of having a County Big Tree Registry, in Maryland only six counties out of 23 have developed one. (See Table 1). The county registries that have been completed so far have been done as a result of one or two people, passionate about big trees, working independently or as a member of their local forest board. In 1943, out of concern for the State’s dwindling forest resources, a Forest Conservancy District Board (hereafter called forest board) was created in every county to promote appreciation and concern for forests and trees (Blake 2004; see <http://www.mdforest.sailorsite.net/> for a list of contacts for Maryland’s forest boards). Initially the boards practiced oversight and regulation of logging, but most of those duties have now been taken over by the state and only some counties require their forest boards to approve logging plans. (Except in the Chesapeake Bay Critical Areas where forest board approval is mandatory for harvests on private land.) Forest board members are volunteers who are appointed by the Director of the DNR Forest Service after recommendation by the local board. The initial term of appointment is three years, or until a replacement is found, and members are frequently reappointed numerous times. On every board there

Table 1. Maryland counties with active big tree registries.

County	List Available	Number of Trees Entered	Maintained
Calvert	<a href="http://calvertforestry.org/Big-Trees.pdf">http://calvertforestry.org/Big-Trees.pdf</a> Booklet available by calling 410-535-5327	160	County Natural Resource Division
Cecil	<a href="http://www.cecilfb.sailorsite.net/cecil_big_tree_list.pdf">http://www.cecilfb.sailorsite.net/cecil_big_tree_list.pdf</a>	215	County Forestry Board
Howard	<a href="http://www.hcforest.sailorsite.net/Champions/champions.html">http://www.hcforest.sailorsite.net/Champions/champions.html</a> and booklet	76	County Forestry Board
Montgomery	<a href="http://www.mcmdforestryboard.org/page4.html">http://www.mcmdforestryboard.org/page4.html</a> and booklet	173	County Forestry Board
Prince George’s	<a href="http://pgparks.com/info/pdf/bigtreechamp.pdf">http://pgparks.com/info/pdf/bigtreechamp.pdf</a>	128	County Park Rangers
Wicomico	<a href="http://www.wicomicobigtrees.info">http://www.wicomicobigtrees.info</a>	76	Salisbury University

is a local DNR project forester who is a non-voting member that serves as the Secretary to the local forest board.

At present there is wide discrepancy among the forest boards in terms of size, composition, action, and focus. Some boards have only five or six members, but others, like Montgomery County, have up to a dozen. Some boards meet regularly, apply for grant funding, and are very active; other boards meet infrequently and rarely question any proposed logging activities. Some boards have placed their emphasis on public education and environmental concerns, while other boards are more concerned with logging regulations. In some counties it is the forest board that has taken on the task of managing the County Big Tree Registry, while in other counties the forest board does not address this at all. In three of the six counties that have Big Tree Registries it is the local forest board that manages the registry. The forest boards of Frederick and Anne Arundel counties have excellent systems for processing state nominations but do not maintain a registry of their own.

Here we will review the current status of the County Big Tree Registries and discuss our expansion of a registry for Wicomico County on Maryland's Eastern Shore.

#### MATERIALS AND METHODS

##### Wicomico County Big Tree Registry

When this project began, in the summer of 2006, there were 11 native or naturalized trees occurring in Wicomico County on the State Big Tree Registry maintained by the Department of Natural Resources, Forestry Division. Through newspaper announcements and personal searching co-author Lindblom sought out additional large trees in the county to build the Wicomico County Big Tree Registry.

The point system for measuring and ranking trees was developed by Fred Besley, the first state forester, in preparation for his first statewide Big Tree Contest. Today the same system, with minor modifications, is used nationwide: 1) the tree circumference points are calculated by measuring the circumference in inches at 4.5 feet above the ground; 2) the height points are calculated by measuring the height in feet, (we used a Suunto clinometer model PM-5/1520); 3) the crown points are calculated by measuring, in feet along the ground, the widest spread of the canopy, then measuring the widest canopy spread perpendicular to the first measurement and finding the mean of these two measurements. This mean is then divided by four. The circumference, height, and crown points are then added together to get a total point score. Champions are determined by this point system.

Between August 2006 and April 2007, 75 trees of 33 species were measured. Thirty-three of these trees qualified for entry into the State Big Tree Registry (see Table 2). Four qualified because they were state champions and the other 29 qualified either because they had 70% of the points of the current state champion or at least 300 total points. Of Wicomico County's original 11 native or naturalized trees on the state registry, four remained as the largest of that species in the county and seven were replaced by larger champions we discovered.

Each tree was photographed and its position was recorded by GPS. A map with the GPS positions of the champions was provided to the county planner in charge of

CHAMPION TREES OF MARYLAND, WITH NEW RECORDS FOR WICOMICO COUNTY

Table 2. New state ranked big trees in Wicomico County. Of the 75 trees in our county big tree registry the 33 new discoveries shown here qualify for entry in the state registry. Four placed as champion trees (largest in the state), four were the second largest tree of that species in the state.

State ID	Common Name	Latin Name	County Rank	State Rank	Points
BT-1747	Red Maple	<i>Acer rubrum</i>	1	7	271
BT-1749	Red Maple	<i>Acer rubrum</i>	2	8	268
BT-1754	Red Maple	<i>Acer rubrum</i>	3	14	238
BT-1771	Pecan	<i>Carya illinoensis</i>	1	2, tied	314
BT-1772	Pecan	<i>Carya illinoensis</i>	2	5	287
BT-1756	American Holly	<i>Ilex opaca</i>	1	3	168
BT-1757	Red Cedar	<i>Juniperus virginiana</i>	1	2	214
BT-1746	Red Cedar	<i>Juniperus virginiana</i>	2	5	204
BT-1745	Sweetgum	<i>Liquidambar styraciflua</i>	1	4	254
BT-1740	Yellow-poplar	<i>Liriodendron tulipifera</i>	2	23	349
BT-1765	Yellow-poplar	<i>Liriodendron tulipifera</i>	3	55	291
BT-1744	Southern Magnolia	<i>Magnolia grandiflora</i>	1	2	232
BT-1755	Southern Magnolia	<i>Magnolia grandiflora</i>	2	3	211
BT-1739	Sweetbay Magnolia	<i>Magnolia virginiana</i>	1	5	92
BT-1751	Red Mulberry	<i>Morus rubra</i>	1	1	216
BT-1766	Loblolly Pine	<i>Pinus taeda</i>	1	1	230
BT-1750	Loblolly Pine	<i>Pinus taeda</i>	2	2	225
BT-1741	Loblolly Pine	<i>Pinus taeda</i>	3	3	213
BT-1748	Loblolly Pine	<i>Pinus taeda</i>	4	6	193
BT-1742	Eastern Cottonwood	<i>Populus deltoids</i>	1	3	272
BT-1767	Southern Red Oak	<i>Quercus falcata</i>	1	9, tied	320
BT-1743	Southern Red Oak	<i>Quercus falcata</i>	2	20	295
BT-1769	Water Oak	<i>Quercus nigra</i>	1	1	246
BT-1768	Water Oak	<i>Quercus nigra</i>	2	4	193
BT-1752	Willow Oak	<i>Quercus phellos</i>	1	13	343
BT-1761	Willow Oak	<i>Quercus phellos</i>	2	21	304
BT-1760	Black Oak	<i>Quercus velutina</i>	1	13	299
BT-1738	Black Oak	<i>Quercus velutina</i>	2	23	272
BT-1770	Sassafras	<i>Sassafras albidum</i>	1	11, tied	156
BT-1735	Baldcypress	<i>Taxodium distichum</i>	1	1	369
BT-1736	Baldcypress	<i>Taxodium distichum</i>	2	4	346
BT-1737	Baldcypress	<i>Taxodium distichum</i>	3	10, tied	278
BT-1759	American Elm	<i>Ulmus americana</i>	1	7	274

reviewing the Forest Conservation Plans. A website was designed and launched to share our Big Tree list with the general public (Lindblom 2007).

#### DISCUSSION

In the 85 years since Maryland's Big Tree Registry began there have been many changes in the political climate, in the environmental regulations, and in the landscape. Some changes that impact Maryland's trees include the development of the forest boards in 1943 and the Forest Conservation Act passed in 1991. The Forest Conservation Act recognizes local champion trees as a priority for conservation during development, but in most places local champion lists either do not exist, or are not readily available. In this research we have collected together, possibly for the first time, information about which Maryland counties have Big Tree Registries and how to access those registries. In addition we have created the first Big Tree Registry for Wicomico County.

We urge those counties that have not maintained a Big Tree Registry to do so. Without knowledge of the location of county champions it is probable that they are not being given recognition and protection. Until 2007 the Department of Natural Resources DNR Forest Service assigned someone to be the Big Tree Coordinator on the State level – with responsibilities for reporting to the National Big Tree Coordinator – but in recent years the DNR has experienced cuts in staffing and through a Memorandum of Understanding dated 7/23/07 transferred the Maryland Big Tree Program responsibilities to the Maryland Association of Forest Conservancy District Boards, a volunteer group that works to support the activities of the DNR Forest Service. The Cecil County Forestry Board volunteered to accept responsibility for funding and management of the program. Cecil Forestry Board member John Bennett has taken over this duty with the understanding that he will be assisted by other local forestry boards. DNR project foresters may assist local boards with training and species identification assistance but may no longer participate directly in the program. Currently there are 16 project foresters for the 23 counties. Local county forest boards are encouraged to create county registries and to respond to new nominations for big trees to be measured. If present forest board members are not inclined to create a registry, a tree loving citizen may want to volunteer to serve on their local forestry board with the objective of creating and managing a registry. There is no limit to the number of members a forest board may have, so there is always the possibility of expanding a board to include those who are interested in big tree work. One need not be a board member, however, to begin, expand, or maintain a registry; county park rangers or citizen scientists can also play an important role.

In the case of Wicomico County, where there was no prior county registry, our student-faculty research team decided to take on the challenge. Perhaps faculty and students in other parts of the state will decide to follow our lead and create other registries, where needed.

Tree species identification skills are necessary for creating a registry, but expert botanists are often available to confirm identifications if assistance is needed. For instance Howard County uses staff from the University of Maryland Cooperative Extension Service to assist with identifications (Steve Parker, personal communication 5/25/2007). At Salisbury University we are establishing a section of our herbarium

specifically for specimens collected from the champion trees. With these specimens in hand, identifications can be confirmed at any time of the year. The skills needed to measure trees can be learned in a few hours from any trained forester. Most forestry boards contain a registered forester able to train measurers. Only trees that qualify as State Champions are required to be measured by a registered forester.

Beyond the consideration of who collects the county big tree records is the consideration of how the information is shared. Once a registry is created the list of champions should be easily accessible. Many champion trees are on private property out of sight from the road. Having an easily accessible champion tree list allows big tree hunters and private property owners to judge if they may have a contender that should be measured.

A few counties have produced informative and attractive websites describing their Champion Trees (see Table 1). Howard County has a particularly well crafted website with photographs of their Champion Trees. Howard County Forestry Board member Jim Rose designed this website and the one for Montgomery County. The Howard County Forest Board has also produced a booklet with information about their champion trees. Printing costs were covered by many sponsors and supporters ranging from tree maintenance companies to private individuals. In Calvert County a big tree booklet was paid for entirely by the county.

It is also important for the champion tree data to be shared with the County Planning and Zoning Department. Each county has at least one person who reviews the Forest Conservation Plans submitted to the planning department prior to development. If this person is not aware of the location of the County's Champions, permission could be granted, unknowingly, for their destruction. The planning office will need information in a different format than that provided to the general public. A GIS layer with GPS locations of the champion trees will probably be most useful to planners. Also, the planners will need more complete addresses than are generally given out to the public. In some counties the forestry board and the county planners work closely to make sure there are no information gaps. In other counties the planner in charge of reviewing the Forest Conservation Plan is not aware of a County list, if one exists. In addition to our GPS data we know of at least two counties, Montgomery and Prince George, which have produced GIS layers of their champion trees.

As we have learned, big tree scouting is rewarding work for a Maryland naturalist, and there is much left to be done.

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## Erratum

Due to circumstances beyond the control of the author, errors in the following manuscript were published in the last issue of *The Maryland Naturalist*:

McAvoy, W. A. 2007. The lycophytes, monilophytes, and gymnosperms of the Delmarva Peninsula, an annotated checklist. *The Maryland Naturalist* 48(1): 1-48.

In order for readers of this manuscript to have the most up to date and accurate information available, a corrected version can be found at the following web address <http://www.dnrec.state.de.us/nhp/services/ListsForms.shtml>.

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